

OLYMPIC COAST NATIONAL MARINE SANCTUARY

A REPORT FOR SANCTUARY ADVISORY COUNCIL MEMBERS

REPORTING PERIOD: JULY 7 – SEPT 13, 2012

ABOUT THE SANCTUARY

Olympic Coast National Marine Sanctuary spans 3,189 square miles of marine waters off the rugged Olympic Peninsula coastline. The sanctuary extends 25 to 50 miles seaward, covering much of the continental shelf and several major submarine canyons.

The sanctuary protects a productive upwelling zone - home to rich marine mammal and seabird faunas, diverse populations of kelp and intertidal algae, and thriving invertebrate communities. The sanctuary is also rich in cultural resources, with over 150 documented historical shipwrecks and the vibrant contemporary cultures of Makah, Quileute, and Hoh Indian Tribes, and Quinault Nation.

OFFICE REPORT

OLYMPIC COAST NATIONAL MARINE SANCTUARY NEWS AND PROGRAM UPDATES

Organized by
Olympic Coast
National Marine
Sanctuary
(OCNMS or
sanctuary)
management
plan priority
areas

TREATY TRUST RESPONSIBILITIES

Coastal Peoples address Climate Change at the First Stewards Symposium

The Hoh, Makah, Quileute Tribes and the Quinault Indian Nation hosted a symposium in Washington DC from July 17-20. The symposium brought together four regional panels; one each for the West Coast states; Alaska; the U.S. Pacific states and territories; and the Great Lakes, Northeast, Mid-Atlantic, Southeast, and Gulf of Mexico states. Each day included opening and closing cultural ceremonies and regional panel discussions. The entire symposium was recorded and is available at <http://www.firststewards.org>. A resolution has been drafted by the newly incorporated First Stewards and sent to the U.S. Congress and President Obama requesting formal recognition of the coastal indigenous people and their expertise in understanding and adapting to changes in their natural systems. The resolution asks for the federal government to “consult with our tribal governments and indigenous communities for guidance in all policies that affect our way of life and to support our management efforts, which will strengthen America’s resiliency and ability to adapt to climate change.” The Office of National Marine Sanctuaries was a partner for the symposium providing staff support to the IPC in planning the event.

Intergovernmental Policy Council Memorandum of Agreement approved by Department of Commerce

In January 2007 the Department of Commerce, the Hoh Tribe, Makah Tribe, Quileute Tribe, the Quinault Indian Nation and the state of Washington signed a Memorandum of Agreement for the purpose of supporting the Olympic Coast Intergovernmental Policy Council (IPC). The original MOA expired in 2012 and has been updated and approved by the IPC members and the Department of Commerce. The new MOA will be valid through September 30, 2017. The sanctuary has recommended that the MOA be signed at the upcoming October 30, 2012 Annual IPC meeting. The MOA recognizes the role of the IPC in providing an effective and efficient forum for communication and exchange of information and policy recommendations regarding the management of the marine resources and activities within the boundaries of the OCNMS.

ACHIEVE EFFECTIVE AND COORDINATED MANAGEMENT

Port Angeles Partners Participate in Joint Marine Campus Planning Workshop

Staff from Office of National Marine Sanctuaries headquarters, Olympic Coast National Marine Sanctuary, Feiro Marine Life Center, and the City of Port Angeles participated in the first of five planning workshops for a joint marine campus in Port

Angeles, WA. The group selected Miller Hull to facilitate the process and prepare a pre-design report that will outline a preferred location, size of a new facility, financing options, and the respective roles of the public and private partners in the creation of a new facility.

This project has the potential to contribute the economic revitalization of downtown Port Angeles, engage the local and regional communities in expanded marine conservation and education initiatives, and provide expanded services to the 500,000 visitors per year that pass through Port Angeles enroute to the Olympic Peninsula.

Working to Improve Relationships and Partnership Opportunities with NMFS in the Pacific Northwest

Staff from the National Marine Fisheries Service Northwest Regions, Olympic Coast National Marine Sanctuary, and the West Coast Region Office met by teleconference to discuss issues of common concern in the Pacific Northwest as a follow up to implementing the “No Surprises” policy between the Office of National Marine Sanctuaries and the National Marine Fisheries Service. The group identified a number of common interests and opportunities and discussed ways to better engage with each other.

CONDUCT COLLABORATIVE RESEARCH, ASSESSMENTS AND MONITORING TO INFORM ECOSYSTEM-BASED MANAGEMENT

Oceanographic Working Group meets to discuss Sanctuary Mooring Program

A working group established under the Olympic Coast National Marine Sanctuary’s Advisory Council held an inaugural meeting to discuss the sanctuary’s historic and current nearshore oceanographic mooring program and potential program expansion or modification to meet oceanographic data needs of outer coast managers. The working group is chaired by Dr. Jan Newton, from University of Washington’s Applied Physics Lab and director of NANOOS, and includes representatives from coastal treaty tribes, University of Washington’s Oceanography Department, NOAA’s Pacific Marine Environmental Laboratory, Washington Department of Fish and Wildlife, and Marine Conservation Institute. The expert working group provided affirmation for the current program design, in terms of mooring placement, instrumentation and data collected. They recognized the significant accomplishments from this modestly funded program and provided a strong endorsement for the continuation of these efforts. Preliminary recommendations were outlined for additional monitoring needs and program expansion.

Oceanographic characterization of Washington’s outer coast, including Olympic Coast National Marine Sanctuary, is limited by relatively low levels of historic monitoring efforts. The sanctuary’s nearshore mooring program has generated a data set covering the past 12 years (in summer months) that can be used to evaluate phenomena such as coastal upwelling, cycles of primary productivity and harmful algal blooms, hypoxic events, ocean acidification.

NANOOS (Regional IOOS) Meeting

Research Coordinator Ed Bowlby participated in the annual Northwest Association Networked Observing Systems (NANOOS) Governing Council meeting in Vancouver, Washington. He reported that Olympic Coast National Marine Sanctuary’s nearshore oceanographic mooring data from 2000-2010 is now available via the sanctuary’s web site. This data is an important piece in understanding oceanographic phenomena of the area.

NANOOS (<http://www.nanoos.org>) is a partnership of over 40 entities, including industry, state agencies, local governments, tribes, non-government organizations, and educational institutions – and is one of eleven regional Integrated Ocean Observing Systems (IOOS) situated around the U.S.

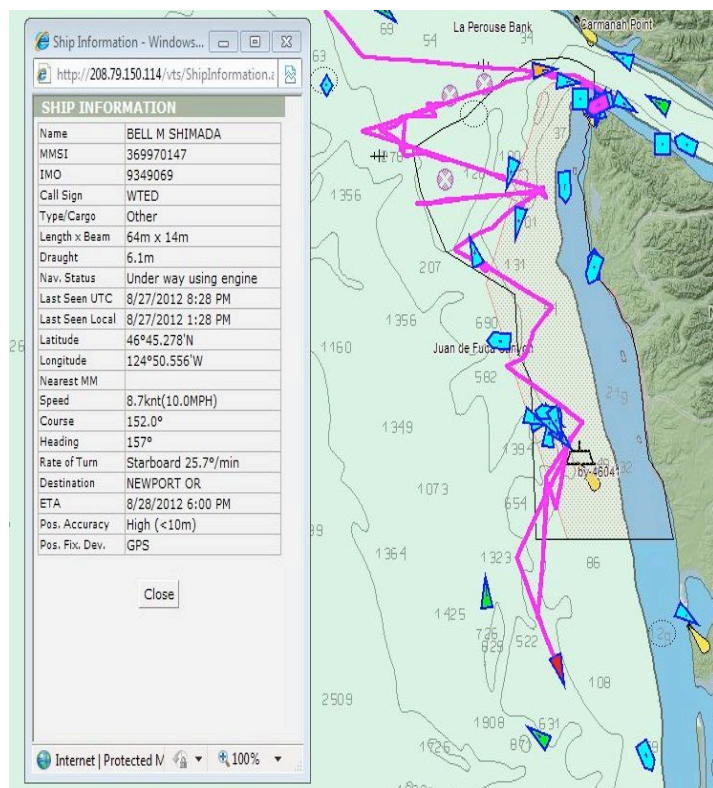
Annual Sea Otter Census in Washington State

Research Coordinator Ed Bowlby completed coverage of one coastal area during the annual Washington sea otter census. From a high promontory at Norwegian Point, he observed over 140 sea otters, with a significant number resting on offshore rocks, somewhat atypical behavior for sea otters that normally rest on the water in large groups. In addition, he observed numerous pelicans and a peregrine falcon pair.

Hypoxic Conditions Found Off Southern Washington Coast

On Aug 30th, 2012, the crew on the R/V TATOOSH was conducting routine servicing operations on the sanctuary’s oceanographic moorings and discovered hypoxic conditions near the seafloor. Waters are considered hypoxic when the dissolved oxygen (DO) is <2 mg/l or <1.43 ml/l. This finding triggered additional sampling effort to determine the extent of

hypoxic conditions. This hypoxia event appeared to be centered off Kalaloch and extend from just south of Teahwhit Head to the southern border of the OCNMS, with an inshore edge between the 27m and 42m contour. Waters south of Cape Elizabeth were not sampled. Notification was distributed to oceanographic listservs for Oregon and Washington. Additional sampling conducted by OCNMS on September 6 and 13 confirmed the persistence of the event. On September 13, hypoxic conditions were found near the bottom at 42m or 50m stations off the entire coastline sampled between Teahwhit Head and Moclips. Off Moclips, hypoxic conditions extended into shallow waters (10m). After each monitoring event, a listserv message was updated and distributed. No observations of dead crab or fish on the shoreline have been reported to OCNMS.



Bell M Shimada track through the OCNMS

NOAA Ship *Bell M. Shimada* Conducts Research in the Sanctuary during its 2012 West Coast Cruise

On September 4, scientists from NOAA PMEL and Oregon State University left Newport, Oregon aboard the NOAA Ship *Bell M. Shimada* to begin the SH1205 NOAA Ocean Acidification Program West Coast cruise of approximately 80 stations along the Washington-Oregon-northern California coast. The objectives of the cruise were to: 1) determine the relationships between ocean acidification and hypoxia along the coast; and 2) provide field calibrations of the wave and profiling gliders along the cruise track.



PMEL Wave Glider -1

IMPROVE OCEAN LITERACY

Jr. Oceanographers: Sensing the Sea Summer Camp & Motion in the Ocean Summer Camp

In July 24 students, grades K-3, participated in a Jr. Oceanographers *Sensing the Sea* camp through a partnership between Olympic Coast National Marine Sanctuary and the Feiro Marine Life Center. Students were led through activities with the theme of enhancing the five senses. Activities included a photo challenge to observe a marine environment through sight, an audio recognition game to learn sounds of the ocean and creatures, observing and touching creatures brought up by divers and caught in a seine, performing an interactive song and dance to incorporate elements from camp activities and various other games and crafts. By the end of camp, participants had a greater understanding of marine and coastal life and had gained observational skills to continue pursuing their interests in science and environmental stewardship.

The following week 11 students, grades 4-6, participated in the Jr. Oceanographers *Motion in the Ocean* camp. With the theme of motion, participants were led through games and activities related to motion in the ocean. Activities included comparative skull anatomy, exploring touch tanks and sea life from the beach, and recording the tides using sticks of various lengths which led up to a culminating lesson on how tides work. All campers participated in a final presentation for parents and staff where they performed skits, poems, and songs that they created incorporating elements discussed throughout the week. Participants learned from, and enjoyed, the hands-on activities and inquiry-based learning.

Olympic Coast Teacher Workshop Focuses on Connections between Western Science and Traditional Knowledge

Olympic Coast National Marine Sanctuary, in partnership with Seattle Aquarium and Makah Cultural and Research Center, conducted a teacher professional development workshop titled *Trash Free Seas: Following Trash from Watershed to Sea*.

Fourteen teachers from Washington's outer coast communities participated in this hands-on, inquiry based workshop focused on nearshore monitoring and stewardship activities. Throughout the four-day workshop, Makah tribal members provided presentations and led discussions on the connections between Western science and traditional knowledge.

By providing this professional development opportunity, the participating teachers can better engage K-12 students and other teachers in experiential education programs focused on the Olympic Coast marine environment, thus improving Ocean Literacy and fostering a lifelong respect for, and understanding of, the Olympic Coast and ocean ecosystems in general.

Coastal American Partnership Award and Commendation

The Seattle Aquarium received a Coastal America Partnership Award and a subsequent letter of commendation by the Acting Secretary of Commerce, Rebecca Blank. The Coastal America Partnership Award recognized the sanctuary's collaboration with the Seattle Aquarium on "Ocean Science," a five-year project funded with a NOAA Environmental Literacy Grant. The Acting Secretary's letter acknowledged that Ocean Science serves as a model for how regional collaborative partnerships can foster ocean awareness.

Ocean Science was a five-year (2006-2011) program designed to integrate NOAA ocean literacy concepts and principles into western Washington formal and informal educational programs. Ocean Science will provide professional development for teachers and classroom and beach field studies for students and their families. Ocean Science also aims to expand peoples' understanding of the ocean's influence on them, as well as their influence on the ocean.

CONSERVE NATURAL RESOURCES IN THE SANCTUARY

Protecting Deep-Sea Corals: The West Coast's Forgotten Treasures

Olympic Coast National Marine Sanctuary Research Coordinator Ed Bowlby was an invited guest for a Marine Conservation Institute (MCI) and Holland America Line event featuring a program on '*Protecting Deep-Sea Corals: The West Coast's Forgotten Treasures.*' At this Seattle event he was also able to hold side-bar discussions with other deep-sea coral colleagues Sandra Brooke (MCI), Bob Stone (Alaska Fishery Science Center), and John Guinotte (MCI). Deep-sea coral photos from the Olympic Coast National Marine Sanctuary were used for the three posters at the event as well as a slide presentation.

Locating and understanding sensitive biogenic habitats, such as deep-sea coral and sponge communities, can help promote better informed management and therefore assist in maintaining the sanctuary's natural biological diversity. It also provides a significant contribution to the groundfish Essential Fish Habitat process for the west coast.

Nancy Foster Scholar Analyzes Deep Sea Video for Fish Habitat Association

Nancy Foster Scholar Katie Wrubel completed four weeks of research collaboration with Olympic Coast National Marine Sanctuary as part of her graduate scholarship. She analyzed 90,000 m² of archived ROV video for fish habitat associations with physical habitat and deep sea corals and sponges. Her report, which included protocols and best practices for analyzing and documenting fish and invertebrate observations, will set the standard for future OCNMS analysis. Katie also presented to OCNMS and ONMS HQ staff describing her research to date and the future of her graduate research.

Planning for Tsunami Marine Debris Response on the Washington Coast

The Washington State Emergency Management Division and the Quileute Nation hosted a meeting of tribes, federal, and state agencies representatives to discuss the development of a tsunami marine debris contingency plan for Washington State, including the outer coast as well as current efforts underway by various agencies to plan for and respond to marine debris. Governor Gregoire has directed state agencies to organize and develop a response plan in the event tsunami marine debris hits the Washington Coast in significant amounts. Representatives discussed the draft contingency plan which will be soon released for public comment and will be the focus of public hearings. Several areas including the need for volunteer coordination, a response plan for invasive species, and the logistical difficulties associated with monitoring and cleanup on the outer coast were discussed. The group agreed to pursue a "table top" drill in which a realistic scenario involving marine debris hitting the Washington Coast would be played out to test our ability to adequately respond and identify additional measures to include in the contingency plan. Olympic National Park, Olympic Coast National Marine Sanctuary, and United States Fish and Wildlife Service also agreed to further develop a more detailed plan for federal lands given overlapping jurisdictions as well as complex operational and policy issues.

SANCTUARY PERMITTING

Issued Permits and Approvals

OCNMS-2012-007 – Tom Butler, NatureBridge, Lake Crescent, WA

Project Title: NatureBridge Citizen Science Ocean Drift Card Project

Permitted Activity: Deployment of wooden drift cards (to track nearshore current patterns). A total of 100 drift cards or less per year will be deployed near La Push and Cape Flattery, Washington.

Project Location: Deployment will be near La Push and Cape Flattery, Washington.

Permit Duration: effective through December 31, 2016

OCNMS-2012-008 - Dr. Brad Hanson, NOAA/Northwest Fisheries Science Center

Project Title: Determining the distribution of killer whales and other cetaceans in the coastal waters of the U.S. using acoustic recorders

Permitted Activity: Deployment of two bottom-anchored moorings with acoustic recorders in OCNMS.

Project Location: OCNMS mooring locations 48°10.148N/125°38.705W and 48°20.061N/125°06.840W

Permit Duration: effective through September 30, 2013

MULTI-2012-004 – Liquid Robotics, Inc., Sunnyvale, CA

Project Title: Wave Glider Operations: Conducting Marine Research

Permitted Activity: Discharge and recovery for approximately one hundred (100) wave glider missions to conduct various research projects.

Project Location: throughout Olympic Coast, Cordell Bank, Gulf of the Farallones, Monterey Bay, and Channel Islands National Marine Sanctuaries

Permit Duration: effective through September 30, 2014.

Note: This is a surface bound glider under development, with potential to carry a variety of scientific instruments and sensors. Specific test missions have not been defined or scheduled. The permittee will consult with each sanctuary before deployments that may enter sanctuary waters.

Pending Permit Requests

None

LEARN ABOUT YOUR SANCTUARY

New information about resources in the sanctuary is always emerging. This section of the office report is reserved for sharing brief descriptions of recent studies, observations, findings, reports, forecasts related to the sanctuary.

Reports from Coastal Observation and Seabird Survey Team (COASST)

The Coastal Observation and Seabird Survey Team (COASST) had 25 volunteers turn in surveys for 23 beaches in Olympic Coast National Marine Sanctuary. Nothing out of the ordinary was noted for bird mortality with the exception of a dead Virginia rail found on a sandy outer coast beach. COASST gained a new volunteer who will begin surveys at one of the most remote locations, Sandpoint.

Reports from Olympic Coast National Marine Sanctuary



Seafloor Mapping Crew: On August 2, 2012 the OCNMS R/V TATOOSH seafloor mapping crew spotted a pod of 20-30 orca whales. Their location was 23 nm west - northwest (WNW) of Cape Alava and they were traveling in a SSE direction. The whales were J pod which had been out in the ocean and later moved inshore. Around noon, orca J37 had a calf.



Seafloor Mapping Crew: A school of ~100 *Lagenorhynchus obliquidens* (Pacific white-sided dolphin, also referred to as 'lags', short for their scientific name) followed the Tatoosh August 22, 2012 while the crew was collecting seafloor video and sediment samples 40 miles west-northwest of LaPush.

Seabird Surveys: On July 21 and August 18, 2012, OCNMS conducted seabird surveys from the R/V TATOOSH. Since 2006, sanctuary researchers have conducted monthly surveys from May through September on a “box transect” heading out of La Push approximately 40 nautical miles, over the Juan de Fuca Canyon in to the pelagic realm. These surveys provide insight into how species composition changes through the upwelling season and areas within the sanctuary that may prove consistently important to seabirds. OCNMS researchers recruit and coordinate seabird identification experts, enter data during surveys and maintain the database. See <http://olympiccoast.noaa.gov/science/surveyscruises/2011/marinebirds.html>

From NOAA CoastWatch, West Coast Node

<http://coastwatch.pfel.noaa.gov/xfer/olympic/>

Sea Surface Temperature during the last weeks of August was 13° C (55.4° F) in the northern section of the Sanctuary and up to 15° C (59° F) in the south and west, typical of late summer surface heating. SST averages range from 8° to 16° during the four month summer-fall interval. (GOES 3-day composite)

Ocean Color Chlorophyll is a proxy for light availability and particulate (inorganic) loading in the upper water column. During last week of August, the northern half of the sanctuary showed concentrations from 4.0 -10.0 µg/L – indicative of a strong upwelling and typical for the season. The southern sanctuary was 4.0 -6.0 µg/L with patchy concentrations as high as 10.0 µg/L. (MODIS, 3-day composite).

From Northwest Fisheries Science Center

<http://www.nwfsc.noaa.gov/research/divisions/fed/oeip/g-forecast.cfm>

Mid-year update of ocean Conditions through June 2012: In the early months of the year, La Niña conditions weakened as sea surface temperatures at the equator increased to near-average values and above-average temperatures in the far Eastern Pacific. As of June 2012, there is a 50% chance that El Niño conditions will develop during the second half of the year. In winter and spring of 2012, SST's were colder than average, running about 0.3° colder than normal nearshore. Temperatures 20 miles offshore were as much as 9° cooler.

During winter (Dec 2011-March 2012), a high proportion of copepod biomass was composed of northern copepods (primarily *Pseudocalanus*, on the order of 80%). This is an indicator of good ocean conditions. It is noteworthy that the biomass of northern copepod species in winter 2012 (January - March) was extraordinarily high, in fact, the highest in our 16-year time series.

Similar to 2011, there is a promising start to the year in terms of cold La Niña conditions and higher than average abundances of northern copepods. There was a relatively late start to the upwelling season, and since the transition, there has not been a consistent pattern of northerly winds. Nevertheless, we expect the favorable biological conditions to persist through the summer.

REGIONAL / NATIONAL ONMS NEWS

40 Years of Sanctuaries – Top 40 Accomplishments

On October 23, 1972, the National Marine Sanctuaries Act was signed, initiating ocean protection and conservation at a scope and scale never seen before. Today, fourteen magnificent protected areas and two generations later, NOAA's National Marine Sanctuary System celebrates its 40th anniversary with a Top 40 list of its most significant accomplishments. Each week day, starting on August 27 and culminating on October 23, an accomplishment will be posted here. Join our celebration and dive into your underwater treasures today!

Thus far, the following accomplishments are directly related to activities and programs of OCNMS:

#31 Citizen Scientists;

#30 First Stewards;

#28 Vessel Traffic;

#26 Visitor Centers

<http://sanctuaries.noaa.gov/news/top40/welcome.html>

Annual West Coast Region Resource Protection Coordinators Meeting

Resource Protection Coordinators (RPC) from the five west coast sanctuaries met for their fourth annual RPC meeting in Monterey, CA on September 6 and 7, 2012. Discussion focused on priority plans and actions that have been identified by the

west coast leadership team and RPCs: engagement with NMFS and PFMC during the 5-year review of groundfish essential fish habitat; spill preparedness; overflight regulations on FAA charts; reducing the risk of ships striking whales and the development of a Vessel of Opportunity Program (VOP) for west coast sanctuaries to monitor whale presence; enhancing our enforcement strategy; and improved coordination with USCG. LCDR Brad Soule from USCG joined us for the last topic to share directly tools and approaches for improving USCG living marine resource patrols and protection of sanctuary resources. On September 6, the west coast RPC team joined the first ever national RPC meeting and shared how the west coast RPC cross cut has produced tangible benefits and efficiencies.

2012 National Marine Sanctuary Advisory Council Summit Conference Call

The second phase of the 2012 National Marine Sanctuary Advisory Council Summit was conducted on Thursday, August 30, 2012. This portion of the Summit was conducted via conference call, and served as a follow-up to the April 9th webinar and a lead-in to the December in-person meeting. Fifty-nine individuals – including advisory council chairs (or representatives), MPA FAC members, and ONMS, MPA Center and NMSF staff, gathered to discuss the value of national marine sanctuaries to the U.S. travel and tourism industry. Advisory council chairs and leadership for the MPA FAC offered individual recommendations related to broadening our engagement with domestic and international visitors. Acting Director of Industry Relations for DOC Office of Travel and Tourism Industries, Julie Heizer, introduced call participants to the Administration's efforts related travel and tourism, including the Travel & Tourism Dashboard, Brand USA, and Recreation.gov. ONMS Chief of Staff for Communications and Stewardship, Matt Stout, offered an overview of the National Travel and Tourism Strategy and highlighted ONMS current efforts with respect to and connections with the travel and tourism industry. A joint session between the 14 advisory council chairs (or representatives) and MPA FAC on this topic, and other common interests, is tentatively scheduled for December 5, 2012, in Santa Cruz, California.

NEWS COVERAGE

Lawmakers seek rapid response, funds to clean up tsunami debris
http://seattletimes.com/html/localnews/2018917752_debris15.html

Climate change conference ends with call for action
<http://www.peninsuladailynews.com/article/20120722/NEWS/307229993/climate-change-conference-ends-with-calls-for-action>

Washington given \$50,000 for tsunami debris bags, bins
<http://www.theolympian.com/2012/08/29/2229529/washington-given-50000-for-tsunami.html>

Book Notes: Explore the West Coast National Marine Sanctuaries with Jean-Michel Cousteau
<http://www.huntingtonnews.net/42506>

Land on the Sand at Copalis State Airport
<http://www.aero-news.net/index.cfm?do=main.textpost&id=a3d9f816-3d47-44e9-9541-743ddac6705d>

The Power of Place: Surfing Olympic Coast National Marine Sanctuary
http://sanctuaries.noaa.gov/news/features/0712_power.html

WEB SITE (<http://olympiccoast.noaa.gov/>)

Follow the OCNMS on Facebook!
<http://www.facebook.com/#!/usolympiccoastgov>

Please take a few moments to peruse the site. Your feedback is greatly appreciated.

*Comments and suggestions can be sent to
Jacqueline.Laverdure@noaa.gov.*

FUN, OCEAN-RELATED WEB SITES

National Oceanic & Atmospheric Administration
<http://www.noaa.gov/>

<http://www.nos.noaa.gov/>

National Ocean Service

Office of National Marine Sanctuaries

<http://www.sanctuaries.nos.noaa.gov/>

Learn More About Your Sanctuary

The Sanctuary Office Report is produced bi-monthly by the Olympic Coast National Marine Sanctuary in conjunction with Sanctuary Advisory Council meetings. To learn more about the Sanctuary please visit our web site at: <http://www.olympiccoast.noaa.gov>.

To learn more about the Sanctuary Advisory Council please visit:
http://olympiccoast.noaa.gov/involved/sac/sac_welcome.html

The Office of National Marine Sanctuaries

The Olympic Coast National Marine Sanctuary is one of 14 marine protected areas in the National Marine Sanctuary System encompassing more than 150,000 square miles of marine and Great Lakes waters from Washington State to the Florida Keys, and from Lake Huron to American Samoa. The system includes 13 national marine sanctuaries and the Papahānaumokuākea Marine National Monument. Visit the ONMS web site at: <http://www.sanctuaries.nos.noaa.gov/>

Get involved!

To learn how to get involved in the Sanctuary visit:
<http://olympiccoast.noaa.gov/involved/welcome.html>

NOAA Marine Debris Program

<http://marinedebris.noaa.gov/>

NOAA Online Media Library

<http://sanctuaries.noaa.gov/photos>

Encyclopedia of National Marine Sanctuaries

<http://www8.nos.noaa.gov/onms/park/>

NOAA Ocean Explorer

<http://oceanexplorer.noaa.gov/>

National Data Buoy Center

<http://www.ndbc.noaa.gov/rmd.shtml>

OCNMS Staff

Carol Bernthal – Superintendent

George Galasso – Deputy Superintendent for Policy & Programs

Kevin Grant - Deputy Superintendent for Operations & Admin.

Patrick A'Hearn – Oceanography Specialist (contractor)

Liam Antrim – Resource Protection Specialist

Thomas Baker – Resource Protection Specialist (recalled to active USCG duty through October 2012)

Lauren Bennett – Acting Sanctuary Advisory Coordinator (contractor)

Ed Bowlby – Research Coordinator

Jennifer Bright – Research Technician (contractor)

Eric Evans – IT Consultant (contractor)

Rick Fletcher– *R/V Tatoosh* Captain, Research Program Support (contractor)

Carey Floyd – Graphic and Web Designer (contractor)

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<http://www.ecy.wa.gov/programs/sea/ocean/index.html>

CoastWatch – West Coast Regional Node

<http://coastwatch.pfel.noaa.gov/>

Washington's Ocean Resources

